State of Utah

Department of
Natural Resources

Division of
Oil, Gas & Mining

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March 4, 2004

CERTIFIED RETURN RECEIPT
7099 3400 0016 8896 2000

Eric York
Moab Salt, LLC
P.O. Box 1208
Moab, Utah 84532

Subject: Initial Review of Notice of Intention to Revise Mining Operations, Moab Salt, Inc., Cane Creek Mine, M/019/005, Grand County, Utah

Dear Mr. York:

The Division has completed its initial review of your draft Notice of Intention to Revise Mining Operations for the Cane Creek Mine, located in Grand County, Utah, which was received October 24, 2003. After reviewing the information, the Division has the following comments which will need to be addressed before tentative approval may be granted. You previously received a draft copy of this technical review which our staff has since discussed in detail with your consultant. We have not changed the comments from the draft.

The comments are listed below under the applicable Minerals Rule heading. In many cases, we have also followed the organization in the plan and even used headings from the plan. Please format your response in a similar fashion. **Please address only those items requested in the attached technical review. You may send replacement pages for the original mining notice using redline and strikeout text, so we can see what changes have been made. After the notice is determined technically complete and we are prepared to issue final approval, we will ask that you send us two copies of the complete and corrected plan. Upon final approval of the permit, we will return one copy stamped "approved" for your records.** Please provide a response to this review by April 16, 2004.

The application is signed by Richard Showengerdt with a statement that he is authorized to complete and file the application on behalf of the

applicant. We understand that Mr. Showengerdt is a consultant acting on behalf of Moab Salt. Although we have reviewed the application, we ask that in the future, the application or a cover letter be signed by an official of Moab Salt who has authority to bind the company to the commitments in the application.

The Division will suspend further review of the Cane Creek Mine Notice of Intention to Revise Mining Operations until your response to this letter is received. If you have any questions in this regard please contact me, Tom Munson, Paul Baker or Doug Jensen of the Minerals Staff. If you wish to arrange another meeting to sit down and discuss this review, please contact us at your earliest convenience. Some staff members have expressed a need to visit the site to better understand certain issues with the plan, and you may want to meet with them and discuss certain aspects of the review at that time. Thank you for your cooperation in completing this permitting action.

Sincerely,

D. Wayne Hedberg
Permit Supervisor
Minerals Regulatory Program

jb
Attachment: Review
cc: Robert Jornayvaz, Intrepid (via e-mail)
Richard Schowengerdt, Shaw Environmental
Gayle Smith, DWQ (via e-mail)
Will Stokes, SITLA
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REVIEW OF NOTICE OF INTENTION TO REVISE MINING OPERATIONS

Moab Salt LLC
Cane Creek Mine

M/019/005

R647-4-104 – Operator's, Surface and Mineral Ownership

The maps show a mine operations boundary, but the cutoff dam to the southeast of the solar ponds is outside this area. It needs to be included in the permitted area. The surface rights map, Exhibit 104-1, does not indicate that Moab Salt owns this land and does not show who owns the land. (PBB)

R647-4-106 - Operation Plan

106.3 Estimated acreages disturbed, reclaimed, annually.

Table 106-3 indicates that the solar ponds disturbed area is 451.8 acres. Under section 106.9 the disturbed acreage is noted at 431.5. Please clarify. (DJ)

Table 106-3 shows the tailings pond as 96.5 acres. On page 21 – Tailings Pond – the acreage is shown as ~147 acres. Please clarify. (DJ)

The text of Section 106.3 says no new activities requiring new surface disturbance are planned with the exception of four new extraction/injection wells as shown on Exhibit 106-2. Exhibit 106-2 shows six new wells rather than four. This apparent discrepancy needs to be corrected or explained. (PBB)

The plan needs to clarify whether the acreage for the proposed well sites is included in the 26.8 acres of disturbance shown for well pads. (PBB)

106.5 Existing soil types, location, amount

The plan needs additional information about how much soil can be salvaged from the landfill area. It may also need more information about the suitability of the material from the dam for use as a soil. Section 110.2.3 of the plan, Page 43, says, "The final two to three foot thick landfill cover is put into place by loading, hauling, and spreading the original base-soil stockpile/dam material over the top of the landfill." How much of this two to three feet of material would be from the dam and how much would come from the soil stockpile? (PBB)

If there would be less than about two feet of stockpiled soil material over the landfill, the Division needs to know what would be under this soil. If it would be material from the dam, there needs to be some characterization of this material for use as a substitute subsoil. In addition, the plan is not clear whether the material from the dam would be mixed with the salvaged soil or if they would be kept separate, and if the plan is that they would be mixed, it is important to know whether the resulting material would be a suitable growth medium. (PBB)

It appears it is not known precisely how much area will be needed for the landfill. Fifteen thousand cubic yards of material is available from the dam, and the operator intends to use some of this material to fill voids in the landfill (see Figure 110-3). How much material from the dam will remain to cover the landfill surface? Will there still be voids in the landfill that might negatively affect rooting depth and/or the water holding capacity of soil on the surface? (PBB)

Because of concerns about the pore volume calculations and salt leaching in the tailings pond, the Division needs additional information about the depth of soils in this area. The soil survey does not have this information, probably because the site is disturbed. (See further discussion in Section 110.2 of this review under the subheading "Pond Surface Flushing.") (PBB)

There are some curiosities in the baseline information, but they do not need to be corrected unless they are found to be in error. The soil to the west of the southernmost solar pond is map unit 21, the Dranyon-Tolman Variant Complex. The text of the plan indicates this soil is at 8000-9000 feet in the La Sal Mountains and that the vegetation includes snowberry, aspen, and aspen peavine. Although this may be the way it was mapped by the Natural Resources Conservation Service, the vegetation and climate descriptions do not fit the area. In addition, some of the soils described in Appendix 106-A do not appear to exist in the area of the Moab Salt operations. (PBB)

106.6 Plan for protecting & redepositing soils

The only new disturbances planned are for four or six new well sites and for the landfill. According to the plan, all surficial materials suitable as a growth medium will be salvaged, and all materials less than three inches in diameter will be stockpiled, posted as topsoil, and revegetated. Rock, including large rock, is an important component of the soil, and soil salvage needs to include saving as much as possible of the rock that is mixed with the soil. (PBB)

106.7 Existing vegetation - species and amount
Section 110.5.7 says reference areas should be used as the revegetation success standard rather than the baseline information, but the plan needs to contain a definitive commitment to this effect. The vegetation information in Appendix 106-C is adequate for the purposes of the plan but not as a success standard. When the information was gathered, the area was in the midst of an extended, severe drought, and this drought probably reduced the amount of vegetation cover compared to what would be present in a normal year. (PBB)

In Section 110.5.8, there is a comment concerning revegetation that if ground cover of the revegetated area is at least 70 percent of the ground cover of the undisturbed area, then the ground cover test has been passed and the soils are assumed to be stable. This statement needs to be modified. Although the vegetation cover would meet the release criteria, the soil would not necessarily be stable. (PBB)

Tables 1 and 2 in Appendix 106-C give information about the minimum rooting depths of several species. What is the source of this information? (PBB)

106.8 Depth to groundwater, extent of overburden, geology
Section 106.8 says geology and hydrogeology baseline information is in Appendix 106-C, but that information is actually in 106-D. (PBB)

106.9 Location & size of ore, waste, tailings, ponds
Wells TP-1, TP-2, & TP-3 are noted as having been sealed over and non-functional. Table 107-1 notes that these three wells have been unplugged. Please clarify. (DJ)

R647-4-107 - Operation Practices

107.1 Drainages to minimize damage
The plan states that presently all drainages from the mine facilities areas are collected in diversion ditches and earthen basins. When the site is reclaimed, how will the flows from storm events be handled? How will the reclamation plan prevent any residual salt contamination from being transported to the Colorado River? (TM & DJ)

107.4 Deleterious material safety stored or removed
The plan says petroleum spill areas will be delineated as to the nature, extent and degree of fuel and related impacts present. The plan goes on to describe a landfarming technique, but it appears only the top foot of soil will be treated. Depending on the amount of petroleum product spilled, it is possible that these products will have penetrated much more deeply since it is not readily adsorbed to the

soil, especially a sandy soil. Please provide a testing protocol for determining the depth of soil contamination. Additional treatment or removal measures will be needed if contamination extends to deeper layers of the soil. (PBB)

R647-4-108 - Hole Plugging Requirements

108.4 Brine Seepage Control Wells/Sumps

Figure 108-2 indicates a closure of #1 shaft which differs from the enclosed UIC permit. The figure states that this closure procedure is a result of 4/18/03 changes to the abandonment plan. Have these changes been approved? If so, please include this approval. (DJ)

The abandonment plan for #1 shaft states that the salt plug presently located in the shaft will be dissolved and pumped to the tailings pond. If the pond is no longer available, where will these solutions be pumped? If different in the UIC permit this portion of the permit should be changed. (DJ)

R647-4-109 - Impact Assessment

109.1 Impacts to surface & groundwater systems

The plan discusses the reclamation of the site but fails to adequately assess the long term impact of the residual salts on the groundwater and surface water environments. The plan needs to present some sort of monitoring and mitigation program that will determine the appropriate treatments should excess salt brines continue to move towards the Colorado River from the reclaimed areas.
The current plan states that the brines will stop moving (within one year) once no more rinse water is put on the ponds and the pump back wells and ponds will be removed. How will the amount of subsurface fluids be determined and when will that flow be such that removal of these facilities will be considered?
The next question is, the plan calls for intensively flushing of any salt impacted areas (5%). What does this mean in regards to these facilities and where will this salt go during this intensive flushing of these areas?
Does the plan define flushing? (TM)

R647-4-110 - Reclamation Plan

110.2 Roads, highwalls, slopes, drainages, pits, etc., reclaimed

Plant Area The plan states that reclamation will cap small waste salt storage areas with growth media.

Will any effort be made to remediate these salt impacted areas before the application of reclamation treatments? Why is the treatment for these areas different from planned treatment for other areas impacted by salt spills included in the plan? How much soil will be used, and from where will it come? (DJ & PBB)

Pipeline Areas The reclamation plan notes that, presently, about 5% of the pipeline areas have been impacted by salt through maintenance and pipe ruptures.
If the plant continues to operate for the projected 50 years, and the system ages, will this estimate be sufficient to cover areas affected by future spills? (DJ)

Solar Ponds The plan states that the pond liners will be flushed with the existing slurry lines to dissolve the remaining salt residues.
The present slurry lines do not appear to be sufficient to complete this task. Please indicate how this task will be accomplished. (DJ)

The approved plan indicates that the salt over the liners can only be harvested to a level of two to three inches. Salt below that level will have a tendency to break into chunks that will tear the underlying liner. The approved plan indicated that to remove this remaining salt, fire hoses would be used.
Will the residual salt on the liners be removed in a similar manner? The plan should detail the method to be used. (DJ)

Labor, supplies and equipment required to complete this task should be included in the bond estimate. (DJ)

The plan states that there will be an establishment of island zones for deeper rooting plants over areas of the planned liner perforations.
What will be the average soil depth in these island areas?
Will areas above each liner perforation be covered with these islands?
Please provide an estimate of the number of these zones to be affected by this activity.
Has the amount of growth material required for reclamation of the ponds been adjusted to account for this additional cover material? (DJ)

The volumetric calculations for the one foot cover for the pad are calculated as a volume needed to cover 451.8 acres with one foot of material.
There is no provision for the additional material required to construct the island zones noted in the plan. (DJ)

Will the seed mix in these island areas differ from the mix used in the rest of the solar pond areas? If so state the differences. (DJ)

The plan states that the perforations in the liner are sufficient to pass precipitation from a 24 hour event.
Because 24 hour storm events are normally intense storms for short durations, the growth medium may have more of a tendency for surface flows than soaking through the one ft of growth medium and passing through the liner perforations.
Some type of surface drainage systems should be designed to facilitate the removal of surface flows from the solar pond area, plant area and the tailings pond areas. (TM & DJ)

Precipitation events that do pass through these liner perforations will report to the area of the recapture system, which will no longer exist after final reclamation.
Will there be anything left in place to treat of any ground or surface water before it enters the river after the pump back wells are removed? (TM & DJ)

One of the purposes of the perforations in the liners is to force any water reaching the liners to concentrate in specific areas. In this way, the salt below the liners in the perforation areas will, hopefully, be leached away which will allow those plants with deeper root systems to extend their roots to the soil below the liners.

The 15 X 15 foot areas are probably too large to force the type of water concentration and leaching needed to allow roots to grow below the liner level. Holes this large would probably leave areas in the middle that would not be leached and where salt might even migrate upwards. For this reason, the Division suggests the perforations should be either smaller or made with a larger perimeter. Rather than having two 15 X 15 foot areas per ten thousand square feet, it might be best to have six 5 X 15 foot areas, two perforations that are each 5 X 45 feet, or 32 circular holes each with a diameter of three feet. (PBB)

The Division has some concerns about how well water and salts will be able to move through the compacted fill under the pond liners, and it may not be possible to answer these questions until some of the revegetation test plots have been implemented.
How rapidly can water flow through the compacted soil beneath the liners? How much water is actually going to reach the liner and make it to the holes so that it can help leach away salts? Will it move through the compacted soil well enough that it can actually remove salts? (PBB)

The test plots do not include soil compaction as part of the treatments. The soil beneath the plots with a perforated liner should be compacted to 95 percent of Proctor and tested for water flow rate before the liner is put down. (PBB)

The soils below the liner seams are most likely to have higher salt concentrations than areas under other parts of the liners, so perforations should not be placed near the seams. (PBB)

The plan notes the use of wide tracked dozers to spread excess material within the berm.
The bond only reflects the use of a D9 dozer for this activity. The Caterpillar Handbook does not indicate that this size of dozer is available in an LGP model. If this equipment is not available what other option is available for use in this activity?

If any changes in this activity occur, please make changes in the bond to reflect these changes. (DJ)

The material to be pumped through the slurry line will be abrasive.
An O & M schedule for the slurry pumping system should be a part of the bonding calculations. (DJ)

The plan says the excess slurry waters will be allowed to drain/flush through the liner perforations.
Two items should be considered when planning the removal of the excess waters through the liner perforations. The suspended solids in the excess water used to transport the slurry to the ponds and the fact that the material beneath the liners has been compacted.
These items could make draining the excess water from the soil above the solar ponds extremely time consuming. In case this is a problem, please include a contingency plan for draining the excess water in a timely manner. (DJ)

None of the maps included in the plan reflect elevations of the liner within each pond, but it is assumed the pond areas are flat or slightly concave.
Pond elevations should be investigated because if this a fact, removal of the flushing water under the liners may become a problem. (DJ)

The plan states that the excess water from the slurry pumping efforts will report to the pump-back system for removal.
Are the pumps presently in the system of sufficient size to handle this additional flow of water? (DJ)

Cutoff/Pumpback Areas The reclamation plan states that once the subsurface flows from the solar pond areas are cut off, a no-flow condition will exist at these areas. If the pond liners are breached to allow for the drainage of precipitation events, won't any water from precipitation events continue to report to these cutoff areas? Will this continue to leach the salt remaining in the soil and rocks, and wouldn't this discharge to the Colorado River? (DJ)

Structure Demolition This section of the plan states that the contractor will be using a Cat 950 loader to load Cat 773D off-road trucks.
The cat handbook states that the hinge pin height at full lift on a Cat 950 is 13'1" and the loading height of a Cat 773D is 12'6". Because of this small difference between these two items, the result will be a low load factor for these trucks using a 950 loader. Has this marginal load factor and increased load time been factored into truck cycle and tonnage? (DJ)

The plan states that Cat 330 excavators with a thumb will be used to break up concrete slabs and footers.
The plan should consider the use of the Cat 330 excavator with the breaker head to break up the concrete to be removed from the demolition of the plant facilities before loading. The concrete used in this type of construction was reinforced and may require this additional effort to break up and remove. (DJ)

Landfill Design & Construction states that a construction manager/ landfill inspector will be stationed at the site. This manager will account for and weigh all trucks dumping in the landfill.
The bond should be adjusted to reflect the cost for this person. The cost of a set of portable scales should also be factored into the estimate. (DJ)

The plan notes that building wastes that contain asbestos will be thoroughly wetted utilizing a sprinkler system during the removal, hauling & landfill placement. Also all asbestos material placed in the landfill will be documented, surveyed and mapped as to the internal location.
No contingencies have been made in the demolition bid for the special handling of this item. The demolition of each building containing this material should reflect the special handling that this material will require. (DJ)

The costs for surveying and for CAD use to map the placement of this material will also need to be included in the estimate. (DJ)

Pond Surface Flushing portion of the plan references Exhibit 110-4 Tailings Pond Reclamation Features, which shows the approximate placement of the pond surface flushing sprays. This exhibit indicates that ~ 6000' of 8" HDPE will be needed for the mobile fresh water line.
The estimate does not include an amount for the purchase, welding and placement of this pipe. Please include these costs in the bond calculations. (DJ)

Two-inch HDPE pipe containing the rotational spray nozzle will be connected to the spray manifold, and these pipes will vary in length from 600' to 1000'.
In reviewing Exhibit 110-4, it was found that unless additional 8" pipe is added to the system, the 1000' pipe lengths would not be sufficient in some areas.
If additional 8" pipe will be necessary to cover this additional area, the bond estimate should be modified to include the purchase and welding of the additional 8" HDPE pipe. (DJ)

The Division is concerned that the sprinklers to be used to flush the tailings pond area could cause erosion problems. There will be little vegetation in these areas, and if the droplets from the sprinklers are large, they could displace a lot of soil. Please provide some discussion of this potential problem and justification for using this type of sprinkler system. (PBB)

Rather than alternating application of water for 24 hours with no water for 24 hours, would it decrease the amount of potential erosion to reduce these times? (PBB)

Please provide information about how deeply salt is expected to be leached through the soil in the tailings pond area. The calculation for the volume of water to be applied is based on the pore volume in 18 inches of soil, but the plan does not contain information about how deep the soil actually is. Unlike the solar ponds, the tailings pond area does not have a liner to prevent salt from rising, so the salt needs to be leached deeply enough that it will not be detrimental to plant growth. (PBB)

110.2.4 Plant Area

The HDPE liner in the salt and potash storage area is scheduled to be removed before reclamation.
No contingency is included in the estimate for the removal of materials that may be stored in this area before removal of the liner can be initiated. (DJ)

The area under the HDPE-lined waste storage area should be reviewed to check for areas of contamination due to leakage of this liner. A characterization of this area should be scheduled before reclamation of this area begins. (DJ)

A line item should be included in the surety estimate for the removal of an estimated amount of contaminated material from this area. (DJ)

The plan states that the liner in the lined salt pond will be perforated and one foot of growth medium placed over the liner.
There are no line items in the bond estimate for the removal of the material that has been stored in this pond. (DJ)

The subsurface material beneath the salt pond has been noted as impacted by salt and brine leakage.
The plan should include some contingencies to rinse or remove this contaminated material before the placement of any growth material. (DJ)

The liner of the salt pond area will be perforated before the growth material is placed. A cost estimation for the perforation of this liner should be included in the surety estimate. (DJ)

110.2.5 Pipeline Areas

The type of pipe used in the construction these pipelines should be identified because pipe types directly affect the cost associated with the removal for final reclamation. (DJ)

The plan says a survey of pipeline areas will be completed to delineate the portion of pipeline that has received a brine release.
Because this facility is scheduled for an additional +50 years of operation, is there a value to doing a survey at this time? (DJ)

110.2.6 Solar Pond

The rinsing of the material beneath the ponds is to be achieved by the flushing action of the excess slurry water.
How will the efficiency of this rinse be proven? Because this material was compacted when it was put in place, fast flushing of these areas may not achieve the desired result. If rinsing is not complete, continued leaching of underlying salt contamination over time could possibly result. (DJ)

Are the capacities of the scavenger/pumpback system sufficient to handle the volumes of water that will be required for during the flushing activity? (DJ)

Will the volumes of flushing fluids result in additional contamination of the areas not presently impacted by normal operations? If so, the additional affected area to be reclaimed should be reflected in the estimate. (DJ)

Liner Positioning The liner is scheduled to be left in place beneath the growth media layer to help isolate brine-impacted fill materials.
Leaving areas of contamination beneath the liners could result in salt migration and the possible contamination of the river. Please state how this closure plan deals with this eventuality and will prevent this scenario. (DJ)

Spreading the berm fill material It has been noted day-to-day operations have resulted in releases that have contaminated the material beneath the solar ponds. Have any studies been initiated to assure that the material presently located in the berms have not been contaminated by these releases? (DJ)

The plan states that the top layer of the cover material will be specially segregated to contain a high percentage of ¼" –1" rock to form a rock mulch to serve as wind protection.
Please include in the plan how this specially design cover material will be applied. (DJ)

Growth Media Reserve It is stated that 351,988 cubic yards of growth medium will be slurried to the solar ponds from test pits shown in photographs 110-1, 110-2 & 110-3. Please show the exact locations of these test pits on one of the plan maps. (DJ)

Slurry System Design The plan states that the slurry line will be 1" thick HDPE pipe.
Is the abrasion resistance sufficient to withstand the volume of the proposed slurry operation? (DJ)

A flexible discharge will be located on the pond areas to assist with the spreading operation.
Please include in the plan how this line will be moved around the pond area during the application operation. (DJ)

No contingency for the purchase of this flexible pipe is included in the surety cost estimate. (DJ)

Material Design The plan discusses a screening and slurry initiation area.

Please include a layout of this screening/slurry area including all the components necessary for the operation and approximate stockpile locations. This drawing is necessary to evaluate the equipment requirements for the operation of this system. (DJ)

110.2.7 Solar Pond Borrow Areas

Before the acceptance of the estimate of only 5% of the borrow areas that will require some reclamation, the Division would like to visit the site to evaluate this estimation. (DJ)

Is there a reason the railroad fill material could not be used as soil for the solar ponds rather than some of the other borrow areas? The soil test results indicate the material would be acceptable. (PBB)

110.2.8 Salt Roads

The salt roads were constructed adjacent to the solar ponds.
Please show the location of these roads on the solar pond areas plan map. (DJ)

The plan for reclaiming the salt roads says the salt will be removed and taken to the landfill. The roads will then be graded, ripped and revegetated as described in Section 110.5 of the plan. Sections of the plan that discuss flushing the soil do not mention the salt roads. Will these areas be furrowed and flushed with water to remove excess salts? (PBB)

110.2.9 Solar Pond Infrastructure Areas

Please show these areas on a plan map which covers the areas impacted. (DJ)

The plan states that the collecting/surge ponds will be filled.
It does not appear these ponds are shown on the solar pond areas map. Please show the location of these features (DJ)

An estimate of the amount of material required to fill these ponds should be included and a description of location where this material come from. (DJ)

The salt impacted areas with the infrastructure area will be flushed with one pore volume of water.
Acceptance of rinsing areas by flushing with one pore volume of water will depend on the results of test plots, planned for the near future. (DJ)

Tests should be run to document whether flushing will contaminate adjacent areas. (DJ)

110.2.10 Cut Off/ Pumpback Areas

The plan says that about 45 percent of the cutoff/pumpback areas will not be naturally revegetating and about 5 percent of the area is expected to exhibit brine release conditions.
Will additional areas within this system be impacted by the larger than average volume of solutions reporting to these areas as a result of the flushing of the pond areas? (DJ)

110.2.11 Drill Hole Pads

The plan states that because there were no salt impacts to the exploration sites, no reclamation will be necessary.
These sites will be evaluated before this analogy can be accepted. (DJ)

110.2.12 Roads

Not reclaiming roads other than state and county roads will need to evaluated on an individual basis. Approval to leave roads will depend on the approved postmining land use of the site and the need for the roads, and the plan needs to give some justification for leaving the roads. (DJ)

110.2.14 Aggregate Borrow Areas

The actual locations and approximate sizes of the aggregate borrow areas need to be plotted on Figure 106-3. (DJ)

The plan states that during the site reclamation activities, the aggregate borrow areas will be reviewed for possible reclamation.
Bonding should reflect complete reclamation of the entire disturbance. (DJ)

110.4 Description or treatment/disposition of deleterious or acid forming material

The plan states that once the growth media layer is in place it will act as a sealing cap for the solar pond area.
If the growth media is forming a seal cap for the pond areas, what is the purpose of perforating the liner before the placement of the growth media? (DJ)

110.5.2 Deep Ripping

The plan states that a single or double shank ripper attachment for a larger dozer is necessary.

The use of a three shank ripper attachment is suggested. This ripper arrangement will allow for a better seed-bed preparation. (DJ)

The plan says most areas of the mine will be harrowed immediately prior to seeding, including the areas that are ripped. Harrowing tends to smooth the surface which is not desirable for plant establishment, a rough surface holds water better and decreases erosion and sedimentation. (PBB)

The Division suggests that most areas of the mine should be ripped rather than harrowed. Deep ripping is necessary in some cases for relieving compaction, but in others, the purpose would be to roughen the surface. Where the only purpose is to roughen the surface, ripping would not need to be as deep, about 12-18 inches. Ripping should be done parallel to the contour as much as possible, and it should be followed almost immediately by broadcast seeding. If this is done, it should not be necessary to harrow the areas after seeding. (PBB)

There are some areas where ripping is not practical or where it would be counterproductive. These include those areas where equipment cannot gain access, the furrowed areas, and the solar ponds. Where equipment access is impossible, the Division will probably accept most methods that allow the soil surface crust to be broken and to let the seed make good contact with the soil. Surface preparation methods for the furrowed areas and for the solar ponds are discussed under the "Soil Ridging" and "Harrowing" subheadings immediately below and in the "Seeding Method" subheading under Section 110.5.4. (PBB)

Exhibit 110-9 is a reclamation treatment map and indicates most areas of the mine will be ripped before being seeded. This appears to contradict the text of the plan which says most of the area would be harrowed, but it is what the Division is asking for in the above paragraphs. The only change needed to the sequence shown on this map is that most areas should not be scarified after being seeded. (PBB)

Exhibit 110-9 indicates the solar ponds would be ripped prior to being seeded. Because the liners will only be covered with about one foot of soil, the ponds cannot be ripped very deeply. They should only be ripped deeply enough to create the furrows and terraces discussed on Page 52, Section 110.2.6.

Soil Ridging

The Division is uncertain exactly how the furrowing technique would be applied and whether it would work using the methods discussed in the plan. Furrowing would be done in pipeline, drill pad, and other small areas where there have been brine spills.

The method, as described in Sections 110.2.5 and 110.5.2 and shown in Figure 110-8, includes cutting furrow channels about 8 to 12 inches deep and applying one pore volume of water. According to Figure 110-8, these areas would then be seeded and fertilized. (PBB)

The idea of the furrows is to allow salts to be leached to the bottoms of the furrows and to be taken to the peaks of the furrows through capillary rise leaving the slopes with less salt and as a suitable place to germinate and grow. For this to succeed, the furrows need to remain intact after they are created and after water has been applied. (PBB)

Flushing is likely to erode the furrows, and normal precipitation and wind will have the same effect. In addition, Section 110.2.5 says that upon completion of intensive flushing activities, the area will be scarified and revegetation activities undertaken as discussed in other sections of the plan. Under the subheading "Imprinting," Section 110.5.2 says imprinting will be done on those areas that have received ridging and furrowing activity that have also developed surface crusting sufficient to interfere with proper seed-soil contact. The Division is concerned that erosion, scarification, or imprinting will damage the furrows such that they will not function as designed. (PBB)

A separate issue is whether the furrows would remove enough salt from the germination/growth area to allow plants to become established and grow. Can enough seeds be kept on the furrow slopes as shown in Figure 110-8? Seeds are more likely to accumulate in the furrow bottoms. In practice, will the furrows remove as much salt from the germination areas as they do in theory? These are questions that can be answered as part of the test plot program, and the Division is willing to allow the basic furrowing plan to be a part of the overall plan with the understanding that it may need to be changed. (PBB)

Harrowing

Harrowing would be done on all areas of the mine except those that have been ridged/furrowed. The purposes include breaking up clods from ripping, removing air pockets, **smoothing** the surface for drill seeders (the site will be broadcast seeded), and others. As mentioned, harrowing tends to smooth the surface, and this is not desirable. It is far better to leave the surface in a roughened condition. (PBB)

Rather than harrowing, the Division suggests that most or all areas, with the possible exception of the solar ponds, be ripped as shown on Exhibit 110-9, and that harrowing not be used. (PBB)

The solar ponds will be terraced and furrowed as illustrated in Figure 110-3. It should not be necessary to harrow these areas *and* terrace and furrow them. (PBB)

Rock Mulching

This portion of the plan states that the gravel fraction will consist of particle sizes greater than 0.5 inches.
In section 110.2.6 the plan states that the size fraction for the rock mulch will range from ¼ to 1 inch. Please clarify. (DJ)

110.5.3 Soil Testing

The plan outlines a plan for sampling and testing soils prior to planting. A minimum of 50 samples would be analyzed.
The bond should contain a line item which would cover the cost of this activity. (DJ)

The plan for soil testing is basically acceptable but needs to be refined. In Section 105.3, the plan says compositing soil samples for larger acreages is recommended. This is acceptable for areas where the soils are mixed in the grading process, where soils are slurried, or where no problems are anticipated. Compositing tends to give average values for a larger area but does not help isolate problem areas. In areas like the tailings pond or along the pipeline where one of the purposes of sampling is to find these problem areas, compositing may still be useful but needs to be planned to allow location of any remaining soils with high salt contents. Spikes in the data need to be followed up with further sampling to determine the extent of remaining contamination. The plan should contain commitments to this effect. (PBB)

The water used in leaching the tailings ponds and other areas, and the water used to slurry soil to the solar ponds, is likely to remove many of the water soluble plant nutrients. The Division does not normally encourage use of chemical fertilizers, but the plan needs to contain a commitment that the operator will evaluate soil nutrient levels and apply fertilizer if these nutrient levels are extremely low. (PBB)

110.5.4 Planting Protocols

Seed Mix

The Division has some recommendations for the seed mixture to be used in reclamation:

1. Fourwing saltbush is a good reclamation species and was found both in the alluvial deposition areas and in the naturally-revegetated berms. The Division recommends including it, at least as a secondary species, for both the solar ponds and for the alluvial soil borrow areas.

2. Although inland saltgrass is probably adapted to the area, the Division questions how easily it can be established from seed. The operator should investigate the possibility of planting plugs.

3. How deep is the water table in the alluvial soil borrow areas? Is it shallow enough to allow coyote willows to become established?

4. Corymbed buckwheat is commonly found in disturbed areas, and it is one of the species in the naturally-revegetated borrow areas. Seed is not normally commercially available, but, if given advance notice, seed companies can usually obtain seed of nearly anything. The Division suggests including this as a secondary or tertiary species.

5. Curlycup gumweed is a native perennial, but it is generally considered a weed and would probably invade the site without being seeded. It should be eliminated from the list of species that might be seeded. (PBB)

Timing

The plan says seeding should be done in November but that it could be done in the December-February period. The Division's experience is that winter seedings rarely succeed. The latest the area should be seeded is December. (PBB)

Operators working with the Division have generally had poor success establishing warm season grasses from seed, and the Division understands that a warm season planting may encourage these species to become established. The Division requests that the operator try a warm season planting of at least some of the warm season species on at least a portion of one of the test plots. Every grass in the test plot seed mix except Indian ricegrass is a warm season species according to information available to the Division. (PBB)

Seeding Method

Most areas of the mine would be seeded then harrowed to bury the seed shallowly and to give better seed/soil contact. The Division is concerned that this will decrease surface roughness although a rough surface is not as critical when the terrain is close to flat. Areas that are ripped should be left as rough as possible, and the ripping needs to be timed so these areas can be seeded almost immediately after ripping. They would not then need to be harrowed. (PBB)

The solar ponds would be terraced and furrowed, and harrowing them would smooth these features. For this reason, harrowing should not be used if the ponds are terraced and furrowed. The Division suggests two alternatives for the surface preparation/seeding sequence that might be used on the solar ponds.

1. After the growth medium has been spread, create the furrows and terraces as planned but seed immediately afterward.

2. Spread the growth medium, seed, then harrow lightly to give better seed/soil contact.

Each of these sequences has its advantages: under the first, the surface would be relatively rough, but under the second, the seed would have better contact with the soil. (PBB)

110.5.5 Test Plots

The plan needs to contain a commitment that it will be modified in accordance with results from the test plots. Neither the Division nor the operator is certain how well the various revegetation treatments will work, but it is likely that some modifications will be needed based on the test plot data. (PBB)

R647-4-111 - Reclamation Practices

111.1 Public safety & welfare

Presently a county maintained road passes through the plant facilities and crosses the pond access road.
The plan for closure is to install a fence along the county road near the evaporation ponds. Please include a cost for this fencing and signage and show the location of this fence on a site map. (DJ)

111.2 Reclamation of natural channels

The plan states that drainages through the mine facilities will be reclaimed along with diversion ditches, natural drainage ways & catch basins.
A line item indicating the area and cost to complete this task should be included in the reclamation estimate. (DJ)

111.3 Erosion & sediment control

This section states that each area deemed to be potentially impacted or impacted by brine solution releases will be ripped or scarified and then seeded for revegetation.

All other areas within the site that have been impacted by brine solutions required flushing prior to seeding. Please state how these areas differ from other areas of the site. (DJ)

R647-4-113 - Surety

Comments on Detailed Cost Breakdown

The factor used as a multiple for many of the costs is noted as units.
Please provide an interpretation of the term "units" being used in many of the cost calculations. We are unable to properly evaluate some portions of this estimate without this interpretation. (DJ)

Mobilization/demobilization for the equipment being used to complete the work should be included in the cost breakdown. (DJ)

Please state the capacity of the water truck being used during the completion of this activity. (DJ)

The estimate includes the use of a Project Engineer, Engineer I, & Engineering Tech but does not indicate what tasks these people will be completing and how they are transported around the site (DJ)

Disposal Well Permitting

Engineering Labor Costs – addition error

Landfill Diversion Berm

The costs reflect an Engineer 1 and an Engineering Tech, staking and flagging but no survey equipment is shown in the cost. (DJ)

A backhoe is included in the costs for placement of rip-rap. The estimate should include a cost for the manufacture, handling and transportation of this material. (DJ)
No costs are shown for the loading and transportation of this material. No mention was made in the plan as to the amount or where the material for the berm will be mined. (DJ)

Tailing Pond Area Grading

Equipment Costs – addition error

System Operation
Equipment indicates that the sprinkler skid will be moved 13 additional times but the pipe will only need to be moved seven times. Please explain why the pipe will not have to be moved every time the skid is moved. (DJ)

Lined Salt Storage Area
Equipment – A D250 dump truck is being used for this activity.
Please include the load capacity of this truck. What function will this truck serve? If it is scheduled for haulage, this section of the bond does not include any equipment to load this truck. (DJ)

The bond does not provide for the removal of the salts and brines from the pond area before liner perforation can begin. (DJ)

The amount of growth medium needed to cover this area with one foot of material is about 1613 cubic yards.
The bond estimate for this activity indicates that the dump truck & D-5 dozer will only require four hours to place and grade this amount of material. Assuming the dump truck has a 10-yard capacity, it will require at total of 161 trips to cover this area. No indication has been given as to where this material will come from, but it seems unlikely that this activity can be completed in four hours. Please review and comment. (DJ)

Plant Grading Area
Equipment Section – Addition error
This section indicates that a D-9 dozer will complete 187 & 109 units of work.
What does the designation of units equate to in actual work performed? (DJ)

Plant facilities demolition only accounts for removal of buildings and concrete.
Most of the larger buildings are salt and potash handling and storage areas, and destruction of these facilities will probably result in contamination of much of the area around these sites.
What contingencies have been made to check the plant area for contamination before the grading and ripping? (DJ)

Plant site demolition calls for the removal of concrete to a depth of three feet.
Is material going to be hauled into the site to fill these depressions or is the rest of the site to be dozed to provide material to make up this shortfall? (DJ)

Delineation Survey

It is assumed that this survey is being made to document actual pipeline locations and areas that have been impacted by brines.

No survey or CAD equipment has been noted in this section to support this activity. (DJ)

Accelerated Reclamation

Equipment

The D-5 dozer is being used to grade sections requiring grading.
No equipment time has been noted for ripping brine impacted areas and the additional areas that will also need to be ripped and seeded. Please include the additional cost in the surety estimate. (DJ)

The estimate indicates that work on the pipeline areas will only require the use of the sheepsfoot for a total of one hour.
Please indicate how this estimate was calculated. (DJ)

Solar Pond Reclamation

Removal of Residual Fluids

Outside Services

This section shows units of power need to complete this operation.
Please indicate what the term unit equates to in this area. (DJ)

Labor Costs

This section estimates that it will only require 16 hours of labor to remove the residual fluids from the solar pond area.
The removal of the fluids from the pond area is not the only activity required to clean the pond area. The plan states that the areas will be flushed with fresh water. A laborer dragging a flexible pipe over 451.8 acres of pond, to dissolve solid materials and flush the residual fluid will require more than 16 hours to complete. (DJ)

Spreading Berm Material

Equipment

The bond estimate indicates that it will require 447 units to spread the 376,000+ cubic yards of berm material over the pond area.
Please include an explanation of how the production rate of this dozer was calculated. Describe the blade configuration for this dozer and estimate the average push distance that will be required to spread this material.

The plan states that LGP dozers will be used to spread this material. The D9 does not have an LGP model available. Because this machine is not presently available, please review the choice of equipment for this activity. (DJ)

Slurry System
Procurement
The bond estimate notes a direct cost for a weigh feeder, slurry basin, and six slurry pumps.
Is this cost estimate a lease cost, or is the stated cost a purchase price? If the cost is a lease, please note the lease terms. (DJ)

Set up - Direct costs
No equipment has been included for the site prep and assisting with the set up of the slurry prep area. (DJ)

Are all the components in this system mobile, or should the use of a crane be considered for use during set-up? (DJ)

Will additional piping and valves be needed to connect this slurry prep system into the slurry delivery system? (DJ)

System Operation – Direct Costs
Outside Services
In this portion of the estimate, the multiplier for the power cost is listed in units. Please state what the term "units" represents. (DJ)

The set-up portion of this estimate utilized a backhoe to set the slurry pumps. Will this backhoe be needed to remove these pumps? (DJ)

Power costs for the weigh feeder and slurry basin are not shown. (DJ)

Material Design
Procurement – Direct Costs
The estimate should consider additional equipment to complete the material design system: an MCC for the entire system, and electrical cables to connect all components.
Please submit a schematic of the screening/slurry area to document components that will make up this system. (DJ)

Mobilization/Shipping
The mobilization cost for the equipment and components contained in this system is estimated at $3000.
Considering the number of components contained in this system, this estimate does not appear to be sufficient. (DJ)

System Operation
Equipment
If the units portion of this estimate equates to hours, the following comments apply. D-5 dozer used to move the slurry will only require 332 hours to spread 351,998 cubic yards of material.
This dozer is equipped with a blade with a 3.39 cubic yard capacity. The production rate for this dozer considering the correction factors, pushing an average distance of 50 feet, would be about 156 cubic yards/hour. If this material has to be moved even a short distance, the estimate does not reflect sufficient dozer time to spread this amount of material. (DJ)

A D250 truck and loader is shown in the estimate to move pre-screen material. Where is this material coming from and how much material are these two pieces of equipment moving. (DJ)

Utilization of equipment to prepare the site before set-up is not shown. (DJ)

The loader used to add material to the screen utilizes 2880 units to screen 351,998 cubic yards of growth material.
The plan states that the screening of this material will require the screening plant to operate 40 weeks operating 24/6. If the designation "units" stands for hours of loader operation, it will only operate a portion of the time during the total of 5760 hours of screening plant operation. Please state if this assumption is correct. (DJ)

Labor
People to provide electrical and mechanical maintenance should be included in the labor calculations. (DJ)

System Decommissioning
Outside Services
A demobilization cost of $2000 appears to be insufficient considering the amount of equipment associated with this operation. (DJ)

Equipment
There is no equipment shown in the estimate that will be needed in the dismantling of this operation. (DJ)

Are all the components in this operation mobile or should a crane to load components be considered? (DJ)

Labor
Addition of a mechanical person and an electrician should be considered to assist in the decommissioning. (DJ)

Delineation Survey

Outside Services
The estimate includes an amount of $1000 for fencing and signs. Please include the length and location and length of this operation. Also include an estimate of the number and location of the signs. (DJ)

Labor Costs
The estimate includes a Project Engineer and Engineer I but does not include equipment needed by these individuals to perform any surveys. (DJ)

Salt Road Reclamation
A more detailed description of this road (length & width) is needed to evaluate the adequacy of this estimate. (DJ)

Solar Pond Infrastructure Area Reclamation
The text of the plan alludes to the reclamation of an infrastructure building and sump. Have these items been included in this reclamation activity? (DJ)

Labor Costs
The estimate includes staking, flagging, a Project Engineer, and Engineer I but no survey equipment to support any work they may have to perform. Please include these items in the estimate. (DJ)

Accelerated Reclamation
Cutoff/pumpback Area Reclamation

Delineation & Mapping
This portion of the estimate includes a cost for the purchase of staking and flagging, a Project Engineer, and Engineer I, but no equipment for surveying and plotting, or site transportation. (DJ)

Procurement
Are the pumps in this area sized to handle the increased flow of water reporting to this area as a result of the flushing of the solar pond area? (DJ)

Equipment
The plan indicates ripping and intensive flushing of areas within the area.
No equipment is shown in the estimate for this activity; please include these costs. (DJ)

Drill Hole Pad Area Reclamation
Please indicate roads (width & distance) to be reclaimed on the appropriate maps and in the text of the plan. (DJ)

Equipment
A service truck & sheepsfoot has been used to imprint other areas within the site. If this equipment is to be used, please include in the estimate. (DJ)

Aggregate Borrow Area Reclamation
The note on this portion of the estimate states that the cost for this item is included in the plant area grading section. This activity could not be found in this section. (DJ)

PCB Transformer Removal Cost
No cost is included for equipment to gather or load these transformers onto transport vehicles. (DJ)

No labor costs are included for personnel to assist in this activity. (DJ)

Revegetation Plan
Plant Area
This part of the plan includes fertilizer for 0.2 acres. Please explain why the other 174 acres will not require the same treatment. If only 0.2 acres are to be fertilized, please locate this area on the plant area map.

Tailings Pond
The estimate indicates that a total of 96.5 acres of the tailings pond will be revegetated.
Is this the entire area affected by this facility? (DJ)

Outside Services
The estimate indicates harrowing/broadcast/harrowing will be the only seed bed preparation for these areas. The plan states that some of the affected areas will be ripped, and ripping of other areas has been recommended. The surety, plan or both should be changed to keep them consistent. (DJ)

Solar Ponds
The acreage to be reclaimed on the solar ponds in this portion of this estimate is listed as 431 acres. Table 106-3 Disturbed Area Summary lists the area of the solar ponds as 451.8 acres. Please explain the difference between these two acreage totals. (DJ)

Seed
The estimated cost of seed is listed as $150/acre. The Division obtained prices for the test plot seed mix from a seed dealer, and the total was $213/acre. Although seed costs can vary significantly, this estimate is probably closer to what it would actually cost. The bond needs to either be adjusted accordingly, or the operator needs to provide additional justification for the cost included in the estimate. (PBB)

Labor
Labor cost in this section is listed at $34.00/hr; all other areas in the estimate are listed at $38.00. Please explain the difference. (DJ)

Solar Pond Borrow

Labor
Labor cost in this section is listed at $34.00/hr; all other areas in the estimate are listed at $38.00. Please explain the difference. (DJ)

Comments on the Belair Demolition of Potash Mine bid

This reflects the use of 20-cubic-yard off road trucks to move demolition debris to the landfill.
Table 110-2 reflects the estimated tonnage of the debris to be generated in the demolition of the facilities at the site.
Belair's bid assumes that the 20-cubic-yard trucks will be capable of moving 20 cubic yards of construction debris. Construction debris could have a swell factor of 40 to 50% depending on the material being handled. The bid should be recalculated to allow for this adjusted load factor. (DJ)